Log Event A

Borehole # 50-11-11

Borehole Information

Farm : T	**Tank :** T-111	**Site Number :** 299-W10-177
N-Coord : 43,387	**W-Coord :** 75,759	**TOC Elevation :** 671.9 est.
Water Level, ft : 84.8	**Date Drilled :** 7/31/1979	

Casing Record

Type : Steel-welded	Thickness : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 95	

Cement Bottom, ft. : 20 **Cement Top, ft. :** 0

Borehole Notes:

Borehole 50-11-11 was drilled in July 1979 and completed to a depth of 92 ft with 6-in.-diameter casing. The casing was not perforated. Grout is present from the ground surface to a depth of 20 ft, forming a grout collar around the outer borehole casing. At the bottom of the borehole, 18 gal of grout forms a grout plug between depths of 90 and 95 ft.

The top of the casing, which is even with the ground surface, is the zero reference for the SGLS.

Equipment Information

Logging System : 2B	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 10/1997	**Calibration Reference :** GJO-HAN-20	**Logging Procedure :** MAC-VZCP 1.7.10-1

Logging Information

Log Run Number : 1	**Log Run Date :** 01/28/1998	**Logging Engineer:** Alan Pearson
Start Depth, ft.: 0.0	**Counting Time, sec.:** 200	**L/R :** L **Shield :** N
Finish Depth, ft. : 33.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

Log Run Number : 2	**Log Run Date :** 01/29/1998	**Logging Engineer:** Alan Pearson
Start Depth, ft.: 85.0	**Counting Time, sec.:** 200	**L/R :** L **Shield :** N
Finish Depth, ft. : 32.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

Log Run Number : 3	**Log Run Date :** 01/30/1998	**Logging Engineer:** Alan Pearson
Start Depth, ft.: 75.0	**Counting Time, sec.:** 200	**L/R :** L **Shield :** N
Finish Depth, ft. : 60.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

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Logging Operation Notes:

This borehole was logged in three log runs. Log run three was a repeat log run performed for quality assurance purposes. The total logging depth achieved by the SGLS was 85 ft. This borehole was logged with the SGLS operating in the move-stop-acquire mode, stopping every 6-in. and collecting spectra data for 200 s.

Analysis Information

Analyst : R.R. Spatz

Data Processing Reference : MAC-VZCP 1.7.9 Analysis Date : 09/09/1998

Analysis Notes :

The pre- and post-survey field verification spectra for all logging runs met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from these spectra were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging.

A casing correction factor for 0.28-in.-thick steel casing was applied to the log data during the analysis process. In those intervals where grout is known to be present, the radionuclide concentrations will be underestimated.

The interval between 60 and 75 ft was relogged as an additional quality check and to demonstrate the repeatability of the radionuclide concentration measurements made by the SGLS.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A rerun plot comparing the measured concentrations of the man-made and naturally occurring radionuclides using the data sets provided by the original and repeated logging runs is included. The measurements repeat within two standard deviations (95-percent confidence level), indicating excellent repeatability of the measured gamma-ray spectral peak intensities used to calculate the radionuclide assays.

A historical gross gamma time-sequence plot and a plot comparing historical gross gamma data with Ru-106 and Co-60 decay curves are also included.

Results/Interpretations:

The radionuclide concentrations identified from the ground surface to 20 ft are only apparent concentrations

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because of the grout in this region of the borehole.

Cs-137 and Co-60 were the man-made radionuclides detected around this borehole. Cs-137 contamination was detected almost continuously from the ground surface to 14 ft at concentrations ranging from 0.15 to 0.9 pCi/g. The maximum Cs-137 concentration for this borehole was 0.9 pCi/g detected at 12 ft.

Co-60 contamination was detected continuously from 68.5 to 71.5 ft at concentrations ranging from 0.1 to 0.3 pCi/g. The maximum Co-60 concentration for this borehole was 0.3 pCi/g detected at 68.5 ft.

The plot of the naturally occurring radionuclides shows the K-40 concentrations increase from a general background of 6 to 11 pCi/g above 38 ft to about 17 pCi/g from 38 to 53 ft. The K-40 concentrations gradually increase from about 12 pCi/g below 53 ft to about 16 pCi/g at 84 ft. Below 72 and 82 ft, the U-238 and Th-232 concentrations increase.